

REMARKS

The Office Action dated April 21, 2006 has been received and carefully noted. A response period having been duly extended from July 21, 2006, until September 21, 2006, by the attached Petition for Extension of Time, the above amendments and the following remarks are submitted as a full and complete response thereto.

Claims 6, 14, and 22 have been amended to be in independent form. Claims 17, 19, 20, and 24 have been amended to more particularly point out and distinctly claim subject matter of the invention. Claims 25-26 are submitted. No new matter has been added. Claims 2, 5, 7, 10, 13, 15, 18, 21, and 23 having been allowed, claims 1, 3, 4, 6, 8, 9, 11, 12, 16, 17, 19, 20, 22, and 25-26 are respectfully submitted for consideration.

As a preliminary matter, applicants appreciate the indication of numerous claims having been allowed. Additionally, claims 6, 14, and 22 were objected to as being dependent upon rejected base claim, but otherwise indicating as being allowable. These claims have been placed in independent form, to include the subject matter of the base claim. It is therefore submitted that claims 6, 14, and 22 contain subject matter which has already been indicated as being allowable.

Claims 1, 3, 9, 11, 17, and 19 were rejected under 35 USC 102(b) as being anticipated by Chizhik (US publication No. 2004/0203395). Applicants respectfully traverse this rejection, and submit at each of these of claims recites subject matter which is neither disclosed or nor suggested in Chizhik.

Claim 1, upon which claims 3, 4, and 8 are dependent, is directed to a method for compensating Doppler shift in a telecommunication system where at least one user terminal is moving in relation to a network element. The method comprises measuring a received uplink signal, and estimating an amount of Doppler frequency compensation for at least one downlink signal related to a user terminal based upon a measured received uplink signal. A Doppler shift is compensated for at least one downlink signal related to the user terminal by shifting a frequency of a signal according to estimating amount of Doppler frequency compensation.

Independent claim 9, upon which claims 11, 12, and 16 are dependent, is directed to a data transmission system for compensating Doppler shift in a telecommunication system where at least one user terminal is moving in relation to a network element. The system comprises means for measuring a received uplink signal, and means for estimating an amount of Doppler frequency compensation for at least one downlink signal related to a user terminal based upon the measured received uplink signal. These are provided for compensating a Doppler shift for at least one downlink signal related to the user terminal by shifting the frequency of a signal according to the estimated amount of Doppler frequency compensation.

Independent claim 17, upon which claims 19, 20, and 24 are dependent, recites a compensating unit configured to compensate a Doppler shift for at least one downlink signal by shifting the frequency of a signal according to the estimated amount of Doppler frequency compensation. Claim 17 comprises a receiving unit configured to receive

measurement results regarding uplink signals, and an estimating unit configured to estimate an amount of Doppler frequency compensation where at least one downlink signal is based upon a measured uplink signal.

As discussed in the present application, Doppler shift between moving elements can be compensated in an efficient and effective manner. As discussed below, the prior art fails to disclose or suggest the claimed invention, and therefore, fails provide the critical and unobvious advantages discussed above.

Chizhik discloses a method and apparatus for slowing the observed rate of channel fluctuations in a multiple antenna system. Referring to Fig. 1 of Chizhik, a MIMO (multi-input multi-output) wireless communication system is shown, including multiple transmit antennas 105, and multiple received antennas 110, located respectfully in transmitter 120 and receiver 155. Transmitter 120 divides primitive data stream 115 into data cell-streams, which are transmitted over antennas 105-1 through 105-4. Referring to Fig. 6a of Chizhik, processing a received signal comprises receiving signal at step 605, forming directional signals at 610, and compensating a Doppler shift at 620. The hardware associated with these steps, includes received antennas 110-1 through 110-4, which then process the signals in beam 4 by 10 (Fig. 5) which can calculate the directional signals at step 610. Each of the directional signals is a composition of the signals which arrive from an angel range which corresponds to the directional signals. Each of the directional signals which are formed by beam-former 510 has a Doppler shift range associated with it. The formed directional signals are then compensated for their

associated Doppler shift, as discussed in paragraphs 0042-0062 of Chizhik. According to Chizhik, however, two signals are received and at least one is processed to compensate for a Doppler shift. This is a significant distinction from the present invention, where there is no need to receive more than one signal. Claim 1, for example, includes a recitation of measuring a received uplink signal, and estimated an amount of frequency compensation for at least one downlink signal related to a user terminal based upon a measured received uplink signal. Furthermore, Chizhik discloses that directional signals are formed before Doppler shift compensation. However, the current application does not require that directional signals would be formed before Doppler shift compensation. Claim 1, as noted previously, is directed to measuring a received uplink signal, estimating Doppler frequency compensation, and compensating Doppler shift. Claim 9 is directed to a data transmission system having similar elements, as is independent claim 17. Similar, claim depending on these independent claims recites similar elements. In view of the above, it is therefore respectfully requested that the rejection of claims 1, 3, 9, 11, 17, and 19 under 35 USC 102 be withdrawn.

Claims 4, 8, 12, 16, 20, and 24 were rejected under 35 USC 103(a) as being unpatentable over Chizhik in view of Geier (US Patent No. 5,525,998). The Office Action took the position of Chizhik disclosed all of elements of the claimed invention, with the exception of estimation of Doppler frequency compensation utilizing information on system geometry, and that the estimated amount of Doppler frequency compensation is filtered or weighted. Geier recited as curing deficiencies in Chizhik. As

will be discussed below, applicants respectfully submit that Geier fails to cure the deficiencies of Chizhik.

Chizhik was discussed above. Claims 4, 8, 12, 16, 20, and 24 are dependent upon claims 1, 9, or 17, and therefore, patentable according to the reasons discussed above. Furthermore, as will be discussed below, Geier fails to cure the deficiencies of Chizhik.

Geier discloses an odometer assisted GPS navigation method. Fig. 2 of Geier illustrates a speed filter 30, Doppler compensation filter 40, heading filter 50, and position filter 60 which are configured to supplement GPS satellite signal data with direct odometer data for a moving vehicle. However, applicants respectfully submit that it is improper to attempt to combine Chizhik and Geier to yield the claimed invention in the field of data transmission method and system. Chizhik is directed to slowing the observed rate of channel fluctuations in a multiple antenna system, while Geier is merely directed to using odometer data to attempt to fill gaps in GPS triangulation data. A person skilled in the art in multiple antenna systems would not seek the teachings of Geier, since it is in an unrelated technical field.

In view of the above, applicants respectfully submit that each of presently dependent claims 1, 3, 4, 6, 8, 9, 11, 12, 14, 16, 17, 19, 20, 22, 24, and 25-26 recites subject matter which is neither disclosed nor suggested in this cited prior art. Applicants submit that this subject matter is more than sufficient to render the claims unobvious to a person of skill in the art. It is therefore respectfully requested that these pending

rejections be withdrawn, and this application pass to issue, with all of claims 1 through 26 contained therein.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
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